REMARKS

Claims 1-15 are pending in the present application.

The presently claimed invention provides, *inter alia*, a method for producing an acrylamide polymer, wherein the acrylamide polymer is white in the form of a powder and is colorless in the form of an aqueous solution, comprising: enzymatically hydrating acrylonitrile containing oxazole at a concentration of 5 mg/kg or less and hydrogen cyanide at a concentration of 1 mg/kg or less to yield acrylamide; and polymerizing monomers containing the acrylamide (Claim 1). Claim 6 further requires that prior to enzymatically hydrating acrylonitrile containing oxazole, the content of oxazole and hydrogen cyanide in an acrylonitrile sample is measured. The presently claimed invention is further defined in Claim 11 as reducing the concentration of oxazole in the acrylonitrile to 5 mg/kg or less of and reducing the concentration of hydrogen cyanide to 1 mg/kg or less following the measurement of the content of oxazole and hydrogen cyanide in an acrylonitrile sample. The presently claimed invention also provides an acrylamide polymer obtained by the claimed methods (Claims 4, 10, and 15). Applicants submit that the art of record fails to disclose or suggest the foregoing and request reconsideration of the outstanding ground of rejection.

The rejection of Claims 1-15 under 35 U.S.C. §103(a) over Hwang et al in view of Abe et al, Ishii et al, and Murao et al is respectfully traversed.

In the Office Action mailed September 18, 2008, the Examiner continues to allege that the invention is obvious over the combined disclosures of Hwang et al, Abe et al, Ishii et al, and Murao et al. Applicants respectfully disagree.

Hwang et al to disclose the polymerization of acrylamide monomers prepared by hydrating acrylonitrile by using a nitrile hydratase. However, as recognized by the Examiner, Hwang et al does not disclose or suggest the content of oxazole and hydrogen cyanide in the acrylonitrile starting material (page 3, third paragraph of the Office Action mailed September 18, 2008).

The Examiner alleges that Abe et al, Ishii et al, and Murao et al compensate for these deficiencies. Specifically, the Examiner alleges that Abe et al provide a disclosure of reducing the oxazole content to the concentration range as claimed and Ishii et al provide a disclosure of reducing the hydrogen cyanide content to the concentration range as claimed. Murao et al is further cited as allegedly disclosing that the reaction is carried out until the concentration of acrylamide reaches at least 30% by mass or more.

Applicants disagree with these allegations by the Examiner, as well as the asserted obviousness based on these allegations. To obtain a proper frame of reference, the following deficiencies in the disclosures of Abe et al, Ishii et al, and Murao et al must be considered:

Abe et al - Abe et al is not an enzymatic process but rather catalytic hydration with water in the presence of a copper-based catalyst (see document throughout, for example, at column 1, lines 6-8 and the Examples).

Murao et al - Murao et al appear to disclose and exemplify the conversion of acrylonitrile to acrylamide by enzymatic hydration (i.e., by using a nitrile hydratase). However, this reference fails to disclose or suggest the oxazole and/or hydrogen cyanide content in the acrylonitrile starting material. Indeed, as we previously argued, it appears that the expectation would be that the oxazole and hydrogen cyanide content in Murao et al would exceed the claimed ranges as this reference utilizes nothing more than commercially available acrylonitrile. Murao et al also fails to disclose or suggest the polymerization step of Claim 1

Ishii et al - Ishii et al suffer from the same deficiencies as Murao et al. Specifically, Ishii et al do not disclose or suggest the content of oxazole and hydrogen cyanide in the acrylonitrile starting material. Further, Ishii et al do not disclose or suggest the polymerization step of Claim 1.

In summary, the only process that provides any disclosure of the oxazole concentration is Abe et al, which does not relate to an enzymatic process as claimed or as disclosed in Hwang et al. The Examiner disregards this difference alleging at the bottom of page 6 of the Office Action that "both Application and Abe teach that oxazole does not participate in the polymerization process, but contributes to water insoluble unreacted monomer... affecting color (Spec) and toxicity (Abe) of the polymer".

With respect to the remainder of the deficiencies in the cited disclosures, the Examiner's basic point is that these disclosures are not facially incompatible. As such, in the view of the Examiner, the skilled artisan would have found motivation to make the various changes in the disclosure of Hwang et al based on the disclosures of Abe et al, Ishii et al, and Murao et al to arrive at the expected result of the present invention. Not only do Applicants take issue with the Examiner's allegations, Applicants further submit that the Examiner has not offered any evidence to support the assertion that the results of the present invention would be expected.

The Examiner is reminded that Applicants can rebut a *prima facie* case of obviousness based on overlapping ranges by showing the criticality of the claimed range. "The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims... In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range

achieves unexpected results relative to the prior art range." *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990).

Applicants again point to the results set forth in Table 1 on page 13 of the specification and submit that these data provide evidence of the criticality of the claimed values. In the outstanding Office Action, the Examiner sets forth the following grounds of criticism of these data:

1) The concentrations of the impurities are not commensurate in scope with the cited references. The Comparative Examples of the present application show oxazole concentration in the range of less than or equal to 5 to 10 ppm and HCN in the range of 0.7-1.0 ppm, while Ishii and Abe disclose less than 1 ppm of both components.

2) The Example is not commensurate in scope with Claim 1, where oxazole concentration is less than 5 ppm and HCN concenctration is less than 1 ppm.

3) The cited references have a lower impurity concentration than presented in the Table.

For the Examiner's convenience, Table 1 on page 13 of the specification, is reproduced below:

	Acrylonitrile Used		Polymer Aqueous Solution		Color of Polymer Powder
	Oxazole Concentration [mg/kg]	Hydrogen Cyanide Concentration [mg/kg]	1% Salt Viscosity [mPa·s]	Solubility	
Example 1	≤5	0.7	3600	+	+
Comparative Example 1	10	0.7	3620	–	±
Comparative Example 2	10	5	3550	–	–
Comparative Example 3	≤5	5	3580	–	±

Solubility: +: Almost no gelatinous substance; –: Gelatinous substance observed
Color: +: White; ±: Slightly yellow; –: Yellow

Applicants again submit that these data show the criticality of the claimed oxazole and hydrogen cyanide content in the acrylonitrile starting material. In particular, Example 1 and Comparative Example 3, support a conclusion of criticality. Specifically, although the only difference between Example 1 and Comparative Example 3 is the concentration of hydrogen cyanide, Example 1 shows improvement in the solubility of polymer aqueous solution and the color of the polymer powder. Heretofore, it was known that hydrogen cyanide contained in acrylonitrile is a catalytic poison. However, the skilled artisan would not know that the concentration of hydrogen cyanide in acrylonitrile affects the quality of acrylamide polymers. Therefore, the results set forth in Table 1 on page 13 of the specification are unexpected. And, as such, the combination of Hwang et al, Abe et al, Ishii et al, and Murao et al do not support an obviousness rejection.

Looking at the Examiner's allegations with respect to Table 1, it should be noted that issues (1) and (2) raised by the Examiner appear to really be a comparison that Applicants are not comparing the invention to itself. Indeed, it appears that the Examiner is not willing to accept Applicants comparison to the closest art, but instead appears to insist that Applicants can only rebut a prima facie case of obviousness by comparing the invention to itself. However, this position is contrary to the standard established by *In re Burckel*, 592 F.2d 1175, 201 USPQ 67 (CCPA 1979), where Applicants must compare the claimed subject matter with the closest prior art to be effective to rebut a *prima facie* case of obviousness. Further, it is also note that although evidence of unexpected results must compare the claimed invention with the closest prior art, applicant is not required to compare the claimed invention with subject matter that does not exist in the prior art. *In re Geiger*, 815 F.2d 686, 689, 2 USPQ2d 1276, 1279 (Fed. Cir. 1987) & *In re Chapman*, 357 F.2d 418, 148 USPQ 711 (CCPA 1966)

In this case, the most relevant comparison is (a) Example 1 of the present application where the oxazole and hydrogen cyanide concentrations are below the claimed threshold values versus (b) a corresponding sample where both the oxazole and hydrogen cyanide concentrations exceed the claimed threshold values. This comparison has already been given as Example 1 vs. Comparative Example 2. Thus, Applicants have sufficiently complied with their requirement to provide a sufficient comparative example demonstrating the criticality of the claimed invention.

Further, with respect to issue (2) raised by the Examiner, it is not clear what the Examiner is looking for. It appears that the Examiner would like to see additional concentrations for the present invention to establish that the criticality across the entire claimed range. However, Applicants remind the Examiner that unless there is reason to doubt the objective truth of the statements contained in the specification, the specification is be taken as enabling for the full scope of the corresponding claims. See also *In re Armbruster*, 512 F.2d 676; *In re Angstadt*, 537 F.2d at 503-504; and *In re Vaeck*, 947 F.2d at 495. Teaching in specification is taken as true unless there is reason for doubt. Since the specification states that the results illustrated in Example 1 flow through the entire scope of the claimed invention, this result is taken as true unless examiner provides some reason for doubt, which has not happened.

Finally, with respect to item (3), the Examiner offers no support for this allegation and in no way provides any reason to doubt and/or disregard the relevance of the evidence provided to demonstrate the criticality of the claimed oxazole and hydrogen cyanide content in the acrylonitrile starting material. Accordingly, this criticism is without merit.

In view of the foregoing, withdrawal of this ground of rejection is requested.

Applicants submit that the present application is now in condition for allowance.

Early notification of such action is earnestly solicited.

Respectfully submitted,

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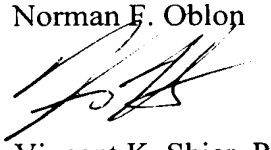

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